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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is excellent in manufacture effectiveness, and relates to the suitable gasket for various industrial ways etc.

[0002]

[Description of the Prior Art] Conventionally, the gasket which has a silicone system coating layer on the front face of a gasket body layer through the primer layer which consists of thermoplastics etc. was known. A silicone system coating layer is for preventing formation of a clearance etc. and raising the seal engine performance of a gasket, and a primer layer is for raising the adhesion force of the silicone system coating layer and a gasket body layer.

[0003] However, when dissolving thermoplastics, such as a polyvinyl butyral, in solvents, such as ethanol and MEK, carrying out screen spreading of the solution and forming a primer layer, the solvent volatilized during the spreading, there were a trouble lacking in workability, like a screen starts clogging and a trouble of requiring a lot of energy and long duration to stoving of a spreading layer, and there was a trouble that it was inferior to the manufacture effectiveness of a gasket generally. Even if it improves screen spreading workability by use of a high boiler, it is difficult for the energy and time amount which desiccation processing takes to increase more, and to, aim at improvement in manufacture effectiveness on the whole.

[0004]

[Problem(s) to be Solved by the Invention] This invention aims at making formation of a primer layer unnecessary. Namely, even if it does not prepare a primer layer, it excels in the adhesion force of a gasket body layer and a silicone system coating layer, the seal engine performance with a good rear spring supporter is maintained at a long period of time, and it aims at obtaining the gasket which is excellent also in manufacture effectiveness.

[0005]

[Means for Solving the Problem] The gasket characterized by this invention consisting of a constituent with which it comes to have a silicone system coating layer in surface some or surface all in a gasket body layer through a surface, and the aforementioned surface uses non-asbestos system fiber, non-silicone system rubber, a silicone denaturation polymer, and a bulking agent as a component in them is offered.

[0006]

[Function] The above-mentioned constituent is excellent in workability, such as roll workability, and excellent also in the adhesive property with the silicone system matter or the non-silicone system matter. Therefore, by preparing the surface which consists of this constituent, a gasket body layer and a silicone system coating layer can be stuck firmly, a primer layer can be made unnecessary, and, moreover, the seal engine performance with a good rear spring supporter can be demonstrated at a long period of time. Moreover, since processing is easy, a surface can be formed efficiently, and it excels in the manufacture effectiveness of a gasket generally.

[0007]

[Description of Component Elements of the Invention] The gasket of this invention has a silicone system coating layer through a surface in surface some or surface all of a gasket body layer. A thing proper as a gasket body layer may be used. All of the various well-known gaskets currently used for the internal combustion engine, especially the automobile engine, etc. can be used.

[0008] The gasket body layer which can be used preferably prepares the constituent layer for seals in both sides of a hook \*\*\*\* metal plate. The gasket which has the gasket body layer of the gestalt concerning drawing 1 was illustrated. The metal plate with which a gasket body layer and 11 have the constituent layer for seals (vulcanization), and 12 has [ 1 ] hook 13, and 2 are [ a surface and 3 ] coating layers.

[0009] What contains 3 - 20 % of the weight of rubber components as a binder, 1 - 30 % of the weight of fiber components, 20 - 80 % of the weight of bulking agents, and a suitable quantity of a rubber chemical, and contains absorptivity resin as a constituent for seals which forms the aforementioned gasket body layer if needed is used more preferably than points, such as seal engine performance and a mechanical strength. Preparation of the constituent for seals can perform each combination component one sort or by using two or more sorts, mixing suitably with various kneading machines etc., and considering as a compound.

[0010] As said rubber component, the synthetic rubber like natural rubber, styrene-butadiene rubber, acrylonitrile-butadiene rubber, acrylic rubber, chloroprene rubber, a fluororubber, EPIKUROROHIDORIGOMU and chlorosulfonated polyethylene rubber, chlorinated polyethylene rubber, ethylene-propylene rubber, and ethylene propylene diene rubber etc. is raised, for example.

[0011] As a fiber component, non-asbestos system fiber is preferably used from points, such as environmental sanitation, and one sort of organic fiber or a non-asbestos system inorganic fiber or two sorts or more are used. As an example of organic fiber, aromatic polyamide fiber, phenol resin fiber, fluororesin fiber, aromatic polyester fiber, aromatic polyimide fiber, aromatic series poly bends IMIDA SOL fiber, cellulose fiber, a carbon fiber, etc. are raised. What is excellent in thermal resistance above all is desirable. Moreover, 1-50 micrometers of 10-1000, and the things that are 20 to about 500 above all are preferably used [ a size ] for an aspect ratio by 5-35 micrometers above all.

[0012] As an example of a non-asbestos system inorganic fiber, a silica fiber, JIRUKONIYA fiber, rock wool, an alumina fiber, alumina silicate fiber, phosphate fiber, sepiolite fiber, gypsum-fibrosus fiber, a potassium titanate fiber, a glass fiber, a metal fiber, etc. are raised. That whose aspect ratio a size is 20 to about 700 in 1-50 micrometers is used preferably. the operating rate of a non-asbestos system inorganic fiber -- per [ 0 (un-using it) ] organic fiber 100 weight section - the 2000 weight sections -- the 50 - 1500 weight section is desirable above all.

[0013] As an example of a bulking agent, talc, clay, a calcium carbonate, a barium sulfate, a mica, a silica, carbon black, an alumina, a vermiculite, the activated clay, the acid clay, etc. are raised.

[0014] As a rubber chemical, what is usually blended with formation of a gasket is used suitably. As the example, a vulcanizing agent, a vulcanization assistant, a vulcanization accelerator, an antioxidant, a pigment or a coloring agent, a coupling agent, etc. are raised.

[0015] The absorptivity resin blended if needed aims at improvement in the water-seal nature based on the swelling by water absorption. 20 or less % of the weight is suitable for the content. The absorptivity resin to be used should just be an insoluble thing at the water which absorbs and swells moisture. The high polymer of water-insoluble nature etc. is raised with the hydrophilic property of the nature containing the ionization nature machine like a carboxyl group, a sulfone radical, a phosphate group, a quaternary ammonium base, the amino group, and a pilus JIUMU base thru/or its salt and/or hydroxyl, a ether group, the shape of a chain, an annular amide group, and the Nonion nature hydrophilic group like a nitrile group thru/or composition as the example.

[0016] More specifically For example, an acrylic acid thru/or the copolymer of the salt and divinylbenzene, The alkali hydrolyzate of the copolymer of acrylonitrile, a vinyl chloride, and an ethylene system monomer, The alkali hydrolyzate of the copolymer of acrylonitrile, a vinylidene chloride, and an ethylene system monomer, The formaldehyde bridge formation object of an acrylamide

system copolymer, the acid condensate of polyacrylic acid and polyvinyl alcohol, The epichlorohydrin bridge formation object of polyvinyl alcohol, the formaldehyde bridge formation object of the alkali hydrolyzate of an acrylonitrile system polymer, the phosphoric acid condensation product of polyvinyl alcohol, etc. are raised.

[0017] Moreover, the copolymer of 2-hydroxyethyl methacrylate and ethylene glycol dimethacrylate, The copolymer of 2-methyl-5-vinylpyridine and N and N'-methylenebis acrylamide, A copolymer with N, and N'- dimethylaminoethyl methacrylate, N, N'-methylenebis acrylamide, The copolymer of an N-vinyl-2-pyrrolidone and ethylene glycol dimethacrylate, The radiation-induced crosslinking object of a polyoxyethylene, the heating condensate under the acidity of starch, The saponification object of starch and an acrylonitrile graft copolymer, vinyl ester and ester system unsaturated carboxylic acid or the saponification object (dry matter) of a copolymer with the derivative, an isobutylene maleic-acid copolymer, etc. are raised.

[0018] The surface prepared in surface some or surface all of a gasket body layer is formed with the constituent which has the seal engine performance which uses non-asbestos system fiber, non-silicone system rubber, a silicone denaturation polymer, and a bulking agent as a component. The constituent for surfaces which can be used more preferably than points, such as seal engine performance, and adhesion between layers, a mechanical strength, contains 3 - 20 % of the weight of binder components which consist of non-silicone system rubber and a silicone denaturation polymer, 1 - 30 % of the weight of fiber components, 40 - 90 % of the weight of bulking agents, and a suitable quantity of a rubber chemical. Preparation of this constituent can perform each combination component one sort or by using two or more sorts, mixing suitably with various kneading machines etc., and considering as a compound.

[0019] Based on the former/latter, 99 / 1 - 90/10 are more suitable for the operating rate of the non-silicone system rubber as a binder, and a silicone denaturation polymer than the point of workability, such as adhesion between layers, and a roll activity. What was illustrated as non-silicone system rubber which can be used with the constituent for seals for forming the above-mentioned gasket body layer is raised. Moreover, as a silicone denaturation polymer, a polyolefine denaturation silicone elastomer, a silicone denaturation acrylic polymer, etc. are raised.

[0020] The aforementioned polyolefine denaturation silicone elastomer makes polyolefines, such as polyethylene, straight chain-like low density polyethylene, ethylene and vinyl acetate, and ethylene ethyl acrylate, react to polyorganosiloxane, and has the presentation of the continuous phase which generally consists of polyolefine, the discontinuous phase (network structure) which consists of silicone rubber (bridge formation object) and a polyolefine silicone copolymerization object, and the compatibility-ized phase which consists of a silicone polyolefine graft compound. This polyolefine denaturation silicone elastomer is marketed as for example, a trade name:sill graft (Nippon Unicar make) etc. On the other hand, the silicone denaturation acrylic polymer is marketed as trade name: SX800(A)-01 (Japan Synthetic Rubber Co., Ltd. make) etc.

[0021] In addition, what was illustrated with the constituent for seals for forming the above-mentioned gasket body layer as the fiber component and bulking agent which are used for preparation of the constituent for surfaces, and a suitable quantity of a rubber chemical is raised. the operating rate of the non-asbestos system inorganic fiber in the constituent for surfaces -- per [ 0 ] organic fiber 100 weight section - 50 weight sections -- 1 - 30 weight section is desirable above all. The method with the proper method which rubs in, sheet-izes a method and a constituent and pastes it up to a gasket body layer can perform surface formation.

[0022] The silicone system coating layer prepared on a surface is formed of silicone system rubber. As the silicone system rubber, all of the silicone system rubber of use can use a room temperature thru/or a heat-curing type, etc. of an addition mold, a condensation mold, etc. conventionally, for example. As the example, CY 52-237 (the Toray Industries Dow Corning make), X32-1134, KE-1083 (all are the Shin-Etsu Chemical Co., Ltd. make), etc. are raised.

[0023] Manufacture of the gasket of this invention to for example, both sides of the support base which consists of a hook \*\*\*\* metal plate etc. After rubbing in the constituent for seals in the condition of not

vulcanizing, by thickness predetermined with a calendering roll etc. and forming by a method etc., The layer of the constituent in the condition for surfaces of not vulcanizing is rubbed in on it, and it forms by the method, the laminating method of a sheet, etc., and they can be heated after that, the constituent layer for seals and the constituent layer for surfaces can be vulcanized, and it can carry out by the approach of subsequently to a surface top forming a silicone system coating layer etc. When using a hook \*\*\*\* metal plate, it is desirable to crush a hook and to pinch the constituent layer for seals thru/or the constituent layer for surfaces by hook.

[0024] The part which forms a surface in the gasket of this invention may be the whole surface of a gasket body layer, and may be only a part in which a silicone system coating layer is prepared. In that case, a gasket body layer may be what was beforehand pierced in the predetermined gestalt so that the engine structure for example, for application might be suited. Although the thickness of the surface to form may be determined suitably, it is usually 0.1-0.3mm above all 0.05-0.5mm. In addition, although the thickness of the constituent layer for seals is not limited, it is 0.2-0.8mm above all 0.1-1.0mm usually. Moreover, although the thickness of the support bases, such as a hook \*\*\*\* metal plate, is not (a hook part is removed) and the thing to limit, it is 0.1-0.5mm above all 0.05-1.0mm usually.

[0025] Formation of a silicone system coating layer is a method with proper for example, screen spreading method, roll coating method, curtain spreading method, dispenser method, etc., can apply silicone system rubber thru/or its diluent on a surface, and can be performed by carrying out hardening processing of it. In addition, on the occasion of formation of a coating layer, a proper additive thru/or drugs can be blended with silicone system rubber according to the former. Although the thickness of the silicone system coating layer to form is arbitrary, generally 10-500 micrometers is 50-200 micrometers above all. In addition, the location which forms a silicone system coating layer to a gasket body layer can be suitably determined according to the former.

[0026] The gasket of this invention can be used for various applications, such as industrial ways, such as an automobile engine. Above all, it is used in favor of the application exposed to elevated-temperature high pressures, such as a cylinder head gasket in an internal combustion engine, and the application in which water etc. participates.

[0027]

[Effect of the Invention] According to this invention, the gasket which the gasket body layer and the silicone system coating layer stuck firmly through the surface which is excellent in the seal engine performance also themselves can be obtained. Consequently, formation of the primer layer which processing takes many efforts can be made unnecessary. And since the constituent for surface formation is excellent in workability, such as roll workability, the good seal engine performance is maintained at a long period of time, and the gasket which is excellent in manufacture effectiveness is obtained.

[0028]

[Example]

as example 1NBR (trade name: pel BUNAN 2818, Bayer make) solid content -- the eight sections (the weight section --) Below The organic fiber (trade name: Kynol, Gunei Chemical Industry Co., Ltd. make) 5 same section, The clay (trade name: software neo carrier K, Asada milling company make) 40.9 section, The talc (trade name: Talc SW, Japanese talc company make) 40 section, the red ochre 5 section, After printing the mixture which consists of the vulcanizing agent (trade name: DCP40C, Mitsui Petrochemical Industries, Ltd. make) 0.5 section and the vulcanizing agent (trade name: made in [ Kayaku AKZO Corp. ] parka link 400) 0.1 section with a calendering roll to both sides of a griddle with a hook with a thickness of 0.25mm and obtaining a gasket body layer, The constituent for surfaces which carried out additional combination of the polyolefine denaturation silicone elastomer (trade name: sill graft -150, Nippon Unicar make) 0.5 section on it at said mixture is printed according to the above. After heating and vulcanizing it at 150 degrees C, screen coating of the condensation mold silicone rubber coating agent (trade name: KE-1081, Shin-Etsu Chemical Co., Ltd. make) is carried out at surface one side. Subsequently it heated for 15 minutes at 150 degrees C for 10 minutes by 80 degrees C, the coating layer with a thickness of 70 micrometers was formed, and the gasket with a thickness of 1.25mm was obtained.

[0029] As example 2NBR (trade name: NIPPORU LX513, Nippon Zeon Co., Ltd. make) solid content, the eight sections, The inorganic fiber (trade name: CMF-150, Nihon Cement Co., Ltd. make) 2 section, the Kynol 3 section, The clay (trade name: transformer link clay 37, product made from en gel HARUTO) 30 section, According to the example 1, the gasket was obtained using the constituent for surfaces which carried out additional combination of the -150; sill graft 1.0 section to the mixture which consists of the talc SW;40 section, the red ochre 5 section, the acid-clay 10.3 section, the C; DCP40 0.6 section, and the 400; parka link 0.1 section, and it.

[0030] As solid content, Example 3 pel BUNAN 2818; The eight sections, the 150; CMF-10 section, The Kynol 3 section, the K; software neo carrier 40 section, the talc SW;32.9 section, The mixture which consists of the red ochre 5 section, the C; DCP40 0.5 section, and the 400; parka link 0.1 section, And according to the example 1, the gasket was obtained using the constituent for surfaces which carried out additional combination of the polyolefine denaturation silicone elastomer (trade name: sill graft -310, Nippon Unicar make) 0.5 section to it.

[0031] Example 4 pel BUNAN 2818; according to the example 1, the gasket was obtained using the constituent for surfaces which carried out additional combination of the silicone denaturation acrylic polymer (trade name: SX800(A)-01, Japan Synthetic Rubber Co., Ltd. make) 3 section to the mixture which consists of the six sections, the Kynol 5 section, the 37; transformer link clay 40.3 section, the talc SW;40 section, the red ochre 5 section, the C; DCP40 0.6 section, and the 400; parka link 0.1 section as solid content, and it.

[0032] Example 5 NIPPORU LX513; according to the example 1, the gasket was obtained using the constituent for surfaces which carried out additional combination of the SX800(A)-01;5 section to the mixture which consists of the four sections, the 150; CMF-4 section, the Kynol 2 section, the 37; transformer link clay 30 section, the talc SW;39 section, the red ochre 5 section, the acid-clay 10.3 section, the C; DCP40 0.6 section, and the 400; parka link 0.1 section as solid content, and it.

[0033] As solid content, Example 6 pel BUNAN 2818; The eight sections, the Kynol 5 section, The K; software neo carrier 40.3 section, the talc SW;35 section, the absorptivity resin (trade name: AKUA rucksack CA ML-20, NIPPON SHOKUBAI Co., Ltd. make) 5 section, According to the example 1, the gasket was obtained using the mixture which consists of the red ochre 5 section, the C; DCP40 0.6 section, and the 400; parka link 0.1 section, and the constituent for surfaces which replaced with the absorptivity resin and blended the -310; sill graft 1.0 section.

[0034] As solid content, Example 7 NIPPORU LX513; The eight sections, the 150; CMF-3 section, The Kynol 3 section, the K; software neo carrier 30 section, the talc SW;30 section, The absorptivity resin (trade name: SUMIKAGERU NP-1010, Sumitomo Chemical Co., Ltd. make) 10 section, the red ochre 5 section, the acid-clay 4.9 section, and a silica (trade name: -- micro silica SF powder --) According to the example 1, the gasket was obtained using the mixture which consists of the 5 by Japan Metals & Chemicals Co., Ltd. section, the C; DCP40 0.5 section, and the 400; parka link 0.1 section, and the constituent for surfaces which replaced with the absorptivity resin and blended the -150; sill graft 0.5 section.

[0035] As solid content, Example of comparison 1 pel BUNAN 2818; The ten sections, the Kynol 5 section, The 37; transformer link clay 30 section, the talc SW;10 section, the red ochre 4.5 section, the acid-clay 39.5 section, the vulcanizing agent (sulfur, Hosoi chemistry company make) 0.05 section, and a vulcanization accelerator (trade name: -- Nocceler TT --) After forming a gasket body layer using the mixture which consists of the 0.45 by the Ouchi Shinko Chemical industrial company section, and the zinc white (Sakai chemistry company make, No. 3) 0.5 section, the direct silicone system coating layer was formed in it according to the example 1, and the gasket was obtained.

[0036] As solid content, Example of comparison 2 pel BUNAN 2818; The five sections, the Kynol 5 section, The 37; transformer link clay 30.5 section, the talc SW;10 section, the red ochre 4.5 section, The acid-clay 39.5 section, the sulfur 0.025 section, the Nocceler TT;0.225 section, And it applies to an example 1 correspondingly at the mixture which consists of the zinc white 0.25 section, and it using the constituent for surfaces which carried out additional combination of the silicone system polymer (trade name: KR2706, Shin-Etsu Chemical Co., Ltd. make) 4.8 section and the silicone system polymer (trade

name: C2706, Shin-Etsu Chemical Co., Ltd. make) 0.2 section. The gasket was obtained.

[0037] As solid content, Example of comparison 3 NIPPORU LX513; The eight sections, the 150; CMF-2 section, The Kynol 3 section, the K; software neo carrier 20 section, the talc SW;6.4 section, The red ocher 5 section, the acid-clay 50 section, the micro silica SF powder;5 section, After forming a gasket body layer using the mixture which consists of the C; DCP40 0.5 section and the 400; parka link 0.1 section, the direct silicone system coating layer was formed in it according to the example 1, and the gasket was obtained.

[0038] The workability at the time of forming the sealing layer and surface in calendering roll processing before forming an evaluation trial workability silicone system coating layer was investigated, and the following criteria estimated.

O : when good workability is shown, it has a sealing layer and a surface and the superposition layer is able to be formed with the sufficient homogeneity of thickness.

x: When it is difficult for it to be lacking in workability and to make a surface superimpose with the sufficient homogeneity of thickness on a sealing layer.

[0039] The silicone system coating layer of the gasket obtained in the adhesive strength example and the example of a comparison was ground against the rubber (JIS 583080 plastic eraser), and the count of grinding until the coating layer separates was investigated.

[0040] The aforementioned result was shown in Table 1.

[Table 1]

	加工性	擦り回数(回)
実施例 1	○	19
実施例 2	○	25
実施例 3	○	20
実施例 4	○	14
実施例 5	○	16
実施例 6	○	21
実施例 7	○	19
比較例 1	○	4
比較例 2	×	18
比較例 3	○	3

[Translation done.]